

IN THE CLAIMS:

Please cancel Claims 1 to 4, 5, 7, 9 to 18, 30 to 33, 35, 36, 38 to 47, 59 to 62, 64, 65, 67 to 76, 90 and 91 without prejudice or disclaimer of subject matter. The claims, as currently pending in the application, read as follows.

1. to 18. (Canceled)

19. (Original) A method of cooling a print head of an ink jet printer before capping, comprising the steps of:

determining an ambient temperature;

determining a print head temperature after receipt of last print data for a print job;

waiting a predetermined time after receipt of the last print data for the print job;

after waiting the predetermined time, ejecting a predetermined number of ink droplets from nozzles of the print head at a frequency lower than a frequency used for printing;

determining a drop in print head temperature caused by ejecting the predetermined number of ink droplets; and

repeating the steps of waiting a predetermined time and ejecting a predetermined number of ink droplets until the print head temperature falls below a threshold.

20. (Original) A method according to Claim 19, wherein the ambient temperature is determined by using a diode disposed in the ink jet printer.

21. (Original) A method according to Claim 19, wherein the print head temperature after receipt of the last print data for the print job is determined by using a calculation based on a number of ink droplets ejected from the print head during the print job.

22. (Original) A method according to Claim 19, wherein the print head temperature after receipt of the last print data for the print job is determined by using a diode disposed on the print head.

23. (Original) A method according to Claim 19, wherein the predetermined time for waiting after receipt of the last print data for the print job is between nine and twelve seconds.

24. (Original) A method according to Claim 19, wherein the predetermined number of ink droplets ejected from nozzles of the print head is thirty per nozzle.

25. (Original) A method according to Claim 19, wherein the frequency that the predetermined number of droplets are ejected from the print head is approximately two kilohertz, and the frequency used for printing is at least five kilohertz.

26. (Original) A method according to Claim 19, wherein the drop in print head temperature caused by ejecting the predetermined number of ink droplets is determined by using a calculation based on the predetermined number of ink droplets ejected and the frequency that the ink droplets are ejected from the print head.

27. (Original) A method according to Claim 19, wherein the drop in print head temperature caused by ejecting the predetermined number of ink droplets is determined by using a diode disposed on the print head.

28. (Original) A method according to Claim 19, further comprising the step of purging ink from the print head in a case that the method of Claim 19 is interrupted before the print head temperature has fallen below the threshold.

29. (Original) A method of cooling a print head of an ink jet printer, comprising the step of repeatedly ejecting a predetermined number of ink droplets from nozzles of the print head at a frequency lower than a frequency used for printing, with a pause between each repetition, until a predetermined threshold is reached.

30. to 47. (Canceled)

48. (Original) An apparatus for controlling cooling of a print head of an ink jet printer before capping, comprising:

a memory including a region for storing executable process steps;

a processor for executing the executable process steps; and  
an interface between the processor and a print head of the ink jet printer that allows the processor to control firing of nozzles of the print head,

wherein the executable process steps include steps of: (a) determining an ambient temperature; (b) determining a print head temperature after receipt of a last print data for a print job; (c) waiting a predetermined time after receipt of the last print data for the print job; (d) after waiting the predetermined time, ejecting a predetermined number of ink droplets from nozzles of the print head at a frequency lower than a frequency used for printing; (e) determining a drop in print head temperature caused by ejecting the predetermined number of ink droplets; and (f) repeating the steps of waiting a predetermined time and ejecting a predetermined number of ink droplets until the print head temperature falls below a threshold.

49. (Original) An apparatus according to Claim 48, wherein the ambient temperature is determined by using a diode disposed in the ink jet printer.

50. (Original) An apparatus according to Claim 48, wherein the print head temperature after receipt of the last print data for the print job is determined by using a calculation based on a number of ink droplets ejected from the print head during the print job.

51. (Original) An apparatus according to Claim 48, wherein the print head temperature after receipt of the last print data for the print job is determined by using a diode disposed on the print head.

52. (Original) An apparatus according to Claim 48, wherein the predetermined time for waiting after receipt of the last print data for the print job is between nine and twelve seconds.

53. (Original) An apparatus according to Claim 48, wherein the predetermined number of ink droplets ejected from nozzles of the print head is thirty per nozzle.

54. (Original) An apparatus according to Claim 48, wherein the frequency that the predetermined number of droplets are ejected from the print head is approximately two kilohertz, and the frequency used for printing is at least five thousand hertz.

55. (Original) An apparatus according to Claim 48, wherein the drop in print head temperature caused by ejecting the predetermined number of ink droplets is determined by using a calculation based on the predetermined number of ink droplets ejected and the frequency that the ink droplets are ejected from the print head.

56. (Original) An apparatus according to Claim 48, wherein the drop in print head temperature caused by ejecting the predetermined number of ink droplets is determined by using a diode disposed on the print head.

57. (Original) An apparatus according to Claim 48, further comprising the step of purging ink from the print head in a case that the process steps of Claim 48 are interrupted before the print head temperature has fallen below the threshold.

58. (Original) An apparatus for controlling cooling a print head of an ink jet printer, comprising:

a memory including a region for storing executable process steps;

a processor for executing the executable process steps; and

an interface between the processor and a print head of the ink jet printer that allows the processor to control firing of nozzles of the print head;

wherein the executable process steps include the step of repeatedly ejecting a predetermined number of ink droplets from nozzles of the print head at a frequency lower than a frequency used for printing, with a pause between each repetition, until a predetermined threshold is reached.

59. to 76. (Canceled)

77. (Original) Computer-executable process steps stored on a computer-readable medium, the computer executable process steps to control cooling of a print head of an ink jet printer before capping, the computer-executable process steps comprising:

code to determine an ambient temperature;

code to determine a print head temperature after receipt of a last print data for a print job;

code to wait a predetermined time after receipt of the last print data for the print job;

code to eject a predetermined number of ink droplets from nozzles of the print head at a frequency lower than a frequency used for printing;

code to determine a drop in print head temperature caused by ejecting the predetermined number of ink droplets; and

code to repeat execution of the code to wait a predetermined time and the code to eject a predetermined number of ink droplets until the print head temperature falls below a threshold.

78. (Original) Computer-executable process steps according to Claim 77, wherein the ambient temperature is determined by using a diode disposed in the ink jet printer.

79. (Original) Computer-executable process steps according to Claim 77, wherein the print head temperature after receipt of the last print data for the print job is

determined by using a calculation based on a number of ink droplets ejected from the print head during the print job.

80. (Original) Computer-executable process steps according to Claim 77, wherein the print head temperature after receipt of the last print data for the print job is determined by using a diode disposed on the print head.

81. (Original) Computer-executable process steps according to Claim 77, wherein the predetermined time for waiting after receipt of the last print data for the print job is between nine and twelve seconds.

82. (Original) Computer-executable process steps according to Claim 77, wherein the predetermined number of ink droplets ejected from nozzles of the print head is thirty per nozzle.

83. (Original) Computer-executable process steps according to Claim 77, wherein the frequency that the predetermined number of droplets are ejected from the print head is approximately two kilohertz, and the frequency used for printing is at least five thousand hertz.

84. (Original) Computer-executable process steps according to Claim 77, wherein the drop in print head temperature caused by ejecting the predetermined number of



ink droplets is determined by using a calculation based on the predetermined number of ink droplets ejected and the frequency that the ink droplets are ejected from the print head.

85. (Original) Computer-executable process steps according to Claim 77, wherein the drop in print head temperature caused by ejecting the predetermined number of ink droplets is determined by using a diode disposed on the print head.

86. (Original) Computer-executable process steps according to Claim 77, further comprising code to purge ink from the print head in a case that the execution of the computer-executable process steps of Claim 77 are interrupted before the print head temperature has fallen below the threshold.

87. (Original) Computer-executable process steps stored on a computer-readable medium, the computer executable process steps to control cooling of a print head of an ink jet printer, the computer-executable process steps comprising code to repeatedly eject a predetermined number of ink droplets from nozzles of the print head at a frequency lower than a frequency used for printing, with a pause between each repetition, until a predetermined threshold is reached.

88. (Previously Presented) A computer-readable medium which stores computer-executable process steps, the computer-executable process steps to control a print operation of an ink jet printer, the computer-executable process steps comprising:

a determining step to determine whether a print head temperature has cooled to a threshold temperature after a printing operation; and

a controlling step to control a capping sequence to cap the print head after the print head temperature has cooled to the threshold temperature.

89. (Previously Presented) A computer-readable medium which stores computer-executable process steps, the computer-executable process steps to control a print operation of an ink jet printer, the computer-executable process steps comprising:

a cooling step to cool a print head by causing ink droplets to be ejected from the print head; and

a capping step to cap the print head after the print head is cooled.

90. (Canceled)

91. (Canceled)

92. (Original) A computer-readable medium which stores computer-executable process steps, the computer-executable process steps to control cooling of a print head of an ink jet printer before capping, the computer-executable process steps comprising:

a first determining step to determine an ambient temperature;

a second determining step to determine a print head temperature after receipt of a last print data for a print job;

a waiting step to wait a predetermined time after receipt of the last print data for the print job;

an ejecting step to eject a predetermined number of ink droplets from nozzles of the print head at a frequency lower than a frequency used for printing;

a third determining step to determine a drop in print head temperature caused by ejecting the predetermined number of ink droplets; and

a repeating step to repeat the waiting step to wait a predetermined time and the ejecting step to eject a predetermined number of ink droplets.

93. (Original) A computer-readable medium which stores computer-executable process steps, the computer-executable process steps to control cooling of a print head of an ink jet printer, the computer-executable process steps comprising the step of repeatedly ejecting a predetermined number of ink droplets from nozzles of the print head at a frequency lower than a frequency used for printing, with a pause between each repetition, until a predetermined threshold is reached.